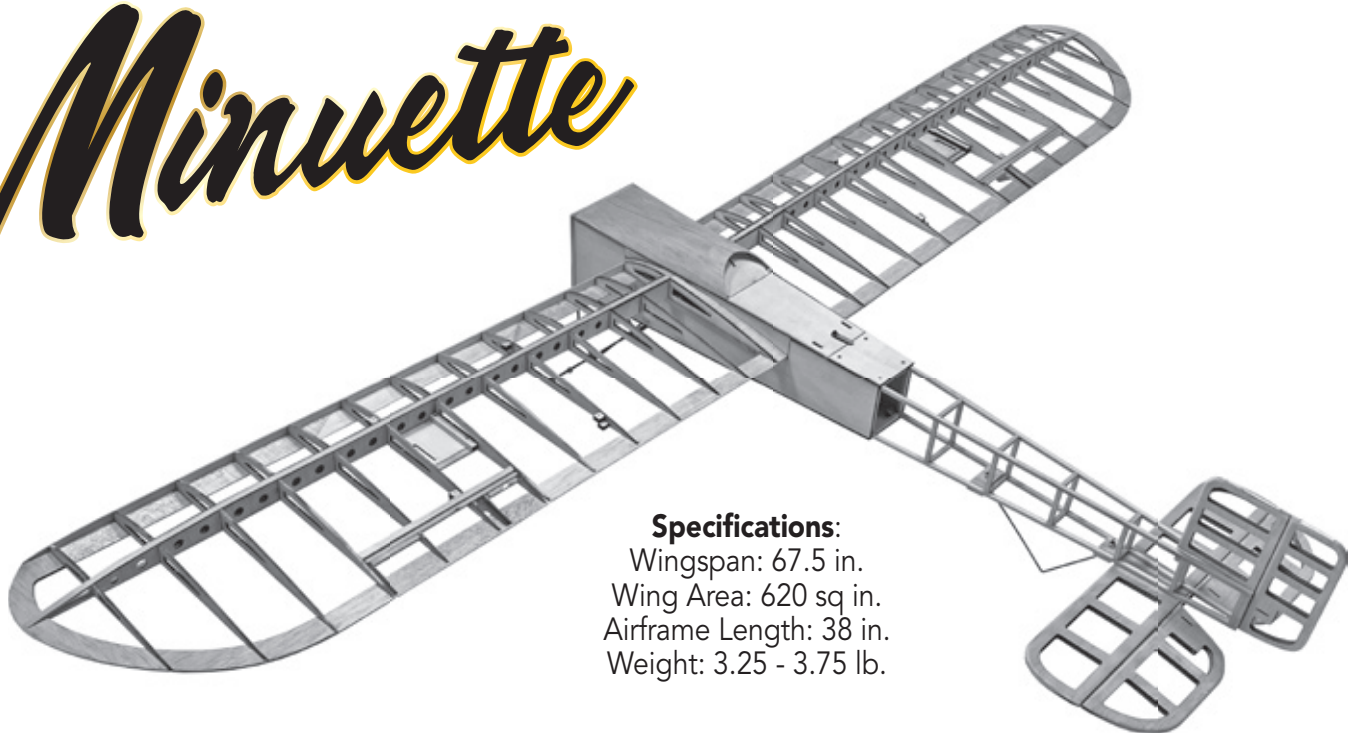
Minuette



Specifications:
Wingspan: 67.5 in.
Wing Area: 620 sq in.
Airframe Length: 38 in.
Weight: 3.25 - 3.75 lb.

CONSTRUCTION MANUAL

Using the Manual

Be sure to read each step thoroughly before you start the step. Test-fit the parts together to make sure they fit properly. If necessary trim to fit.

Beside each step you will notice a check box (or two). These are so you can keep track of your progress while building your kit. For steps that have two boxes, as in the construction of the left and right wing halves, these steps must be performed at two different times.

- Your **Old School Model Works** aircraft should not be considered a toy, but rather a sophisticated, working model that functions very much like a full-size airplane. Because of its performance capabilities, this model, if not assembled and operated correctly, could possibly cause injury to yourself or spectators, and damage to property.
- You must assemble this model according to the instructions. Do not alter or modify this model, as doing so may result in an unsafe or un-flyable model. In a few cases the instructions may differ slightly from the photos. In those instances the written instructions should be considered as correct.
- You must take time to build straight, true and strong.
- You must use a R/C radio system that is in first-class condition, a correctly sized power system and components (electronics, batteries, wheels, etc.) throughout the building process.
- You must correctly install all R/C and other components so that the model operates correctly on the ground and in the air. (Installation shown in the manual is a suggestion. You may have to adjust the mounting steps to accommodate the size of your radio equipment.)
- You must check the operation of the model before every flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check clevises or other connectors often and replace them if they show any signs of wear or fatigue.

- If you are not an experienced pilot or have not flown this type of model before, we recommend that you get the assistance of an experienced pilot in your R/C club for your first flights. If you're not a member of a club, your local hobby shop has information about clubs in your area whose membership includes experienced pilots.
- While this kit has been flight tested to exceed normal use, if this model will be used for extremely high stress flying, such as racing, or if a power system larger than one in the recommended range is used, the modeler is responsible for taking steps to reinforce the high stress points and/or substituting hardware more suitable for the increased stress.

Remember: Take your time and follow the instructions to end up with a well-built model that is straight and true.

Old School MODEL WORKS

www.oldschoolmodels.com

WARNING

READ THROUGH THIS MANUAL BEFORE STARTING CONSTRUCTION. IT CONTAINS IMPORTANT WARNINGS AND INSTRUCTIONS CONCERNING THE CONSTRUCTION AND USE OF THIS MODEL.

A Radio-Controlled aircraft is not a toy! If misused, it can cause serious bodily harm and damage to property. Fly only in open areas, preferably at AMA (Academy of Model Aeronautics) approved flying sites, following all instructions included with your radio, powerplant, electronics and batteries.

- Inspect your model before every flight to ensure it is airworthy.
- Be aware of any other radio frequency user who may present an interference problem.
- Always be courteous and respectful of other users in your selected flight area.
- Choose an area clear of obstacles and large enough to safely accommodate your flying activity.
- Make sure this area is clear of friends and spectators prior to launching your aircraft.
- Be aware of other activities in the vicinity of your flight path that could cause potential conflict.
- Carefully plan your flight path prior to launch.
- Abide by any and all established AMA National Model Aircraft Safety Codes.

IMPORTANT!!! Two of the most important things you can do to preserve the radio controlled aircraft hobby are to avoid flying near full-scale aircraft and avoid flying near or over groups of people.

WARNING: This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

INCLUDED ITEMS

Wood parts included in this kit:

- 1 - LP1 - laser cut 1/8" x 5" x 24" lite ply
- 1 - LP2 - laser cut 1/8" x 5" x 24" lite ply
- 1 - LP3 - laser cut 1/8" x 2" x 24" lite ply
- 1 - LP4 - laser cut 1/8" x 5" x 24" lite ply
- 1 - LP5 - laser cut 1/8" x 5" x 24" lite ply
- 1 - LP6 - laser cut 1/8" x 2" x 24" lite ply
- 1 - LP7 - laser cut 1/8" x 5" x 24" lite ply
- 1 - LP8 - laser cut 1/16" x 2" x 4" ply
- 2 - DH1 - laser cut dihedral braces - 1/8" ply

- 2 - BP1 - laser cut 3/32" x 4" x 12" balsa
- 2 - BP2 - laser cut 3/32" x 4" x 12" balsa
- 2 - BP3 - laser cut 3/32" x 4" x 12" balsa
- 1 - BP4 - laser cut 3/32" x 4" x 24" balsa
- 2 - BP5 - laser cut 1/16" x 4" x 12" balsa
- 2 - BP6 - laser cut 1/16" x 4" x 12" balsa
- 2 - BP7 - laser cut 1/16" x 4" x 12" balsa
- 2 - BP8 - laser cut 1/16" x 4" x 12" balsa
- 2 - BP9 - laser cut 1/16" x 4" x 24" balsa
- 2 - BP10 - laser cut 1/16" x 4" x 24" balsa
- 1 - BP11 - laser cut 1/16" x 4" x 12" balsa
- 1 - BP12 - laser cut 1/16" x 4" x 12" balsa
- 4 - BP13 - laser cut 1/16" x 4" x 12" balsa
- 3 - 1/16" x 4" x 12" balsa

- 3 - 1/4" x 1/2" x 36" balsa strips
- 3 - 3/16" x 3/16" x 36" balsa strips
- 4 - 3/16" x 3/16" x 36" basswood strips
- 4 - 1/8" x 1/4" x 36" basswood strips
- 2 - 1/8" x 1/8" x 36" basswood strips

Hardware parts included in this kit:

- 2 - pre-bent main gear strut wires
- 1 - main gear axle
- 1 - pre-bent tail skid wire
- C/A type hinges for control surfaces
- 2 - wheel collars 1/8" I.D.
- 2 - wheel collars 3/32" I.D.
- 2 - plastic gear straps
- 15 - 2-56 x 3/4" self tapping screws
- 2 - 1/4-20 x 2" wing bolts
- 1 - 4-40 x 1 Socket head cap screw
- 3 - 4-40 lock nuts
- 1 - 4-40 nut
- 5 - #4 washers

Other items included in this kit:

- 2 - Rolled plans (fuselage and wing)
- 1 - Construction Manual

ITEMS NEEDED

Hardware needed (not included in the kit)

For some of these items there is more than one option which will require a bit of decision making ahead of time. There isn't a right or a wrong choice, so choose the items that work best for you.

We strongly recommended supporting your local hobby shop.

- Powerplant: 250+ watt electric, 3s lipo, 40amp ESC (or .15-.25 2-stroke glow engine)
- Propeller
- Engine/Motor mount and mounting hardware
- 4 ounce fuel tank and fuel tubing (if glow)
- Receiver - (3 channel minimum)
- Servos
  If 3 channel, 2 servos (electric), 3 servos (glow)
  If 4 channel, 4 servos (electric), 5 servos (glow)
  We used Sub-Micro servos all around.
- "Y" servo harness (for ailerons)
- Pushrods - two 5" for ailerons, two pull-pull setups for elevator and rudder), one 10" for throttle (if glow.)
- Clevises for the pushrods.
- Wheels: two 3-1/2" vintage style for mains.

- Covering: If you're using single color scheme, one 2 meter roll of covering will cover all of the flying surfaces, if measured and cut carefully.
- Optional: Minuette Accessory kit - sold separately.

Additional Required Building Tools and Adhesives

- Drill & assorted drill bits
- Hobby knife and #10 blades
- Sandpaper: coarse (80 or 100 grit) & medium (150-200 grit)
- Pencil or pen
- Ruler
- T-Pins
- Waxed paper
- Building board
- 2-part epoxy (6 or 15 minute)
- Epoxy brushes and mixing sticks
- Wood adhesives of your choice. We use medium viscosity CA (cyanoacrylate) , but aliphatic resin and/or carpenter's glues (used correctly) will work just as well and give longer working time.
- Thin CA for attaching the included hinges

Although an easy to build kit, our Minuette kit is not for the novice builder. We are assuming the builder is used to constructing balsa kits and has the techniques and skills necessary to do so.

Closely inspect the supplied laser cut parts for damage. If you find any damaged or missing parts, contact us within 60 days of purchase.

When removing the laser cut parts from their sheets, you'll notice the parts are held in place by several small "tabs". These tabs are uncut pieces of wood and can sometimes make it difficult to remove a part. Rather than breaking and/or splintering the wood by forcing out the part, we recommend removing any laser cut parts from their sheets by using a hobby knife with a #10 blade. A quick cut of the tab will allow the piece to be removed with no damage. Sand any tab remainders flush with the part so there will be no problem aligning them later.

It's best to not remove parts from their sheets until they are needed. Refer to Appendix A of this manual as a reference to what all the laser cut parts look like and are called.

You'll notice a check box next to each step. Check these off as you go along so you don't miss a step. Some steps (building the wing) have two boxes - this means the step will be done twice - once now and once later (when told to repeat) for each wing half (or other part). There could be a step or two which leaves you a bit puzzled. If this happens, step back and study the photo(s) for that step - both in this manual and online.

All photos shown in this manual are of different Minuette prototypes. Several pieces may have changed slightly with improvements we've made so parts may look a little different in some steps.

Online Supplementary Photos

We realize that the smaller black-and-white photos in this manual might not show some of the steps as clearly as you might want. So we've anticipated this and made these photos available on our website. You can either scan the QR code or type this address into your browser:

www.oldschoolmodels.com/mpics/minuette/

IT IS VERY IMPORTANT THAT YOU ASSEMBLE THE MINUETTE KIT IN THE ORDER DESCRIBED. SKIPPING FORWARD IN THE STEPS COULD LEAVE YOU WITHOUT THE PROPER LENGTHS OF WOOD TO FINISH THE KIT. WE'VE INCLUDED ENOUGH WOOD TO EASILY COMPLETE THIS KIT, BUT YOU MUST TAKE CARE TO PROPERLY MEASURE AND NOT WASTE WOOD WHEN CUTTING.

IF YOU READ NOTHING ELSE IN THIS MANUAL, PLEASE READ THESE FOUR POINTS.

#1 - PLYWOOD HAS BOWS AND WARPS IN IT 95% OF THE TIME. Because of this, we engineered the Minuette to eliminate these warps whenever possible - we'll make recommendations on how to overcome them as we go along.

#2 - THE MINUETTE IS NOT DESIGNED OR STRESSED FOR AEROBATICS. It is meant to be flown smooth and easy, just like any full-scale aircraft of the Edwardian era would have been flown.

#3 - THE MINUETTE IS PRIMARILY DESIGNED FOR ELECTRIC POWER. Glow can be used, but mounting a 2-stroke can present problems with the large firewall.

#4 - THE REMOVABLE FLYING WIRES & PYLONS IN THE OPTIONAL ACCESSORY KIT ARE DECORATIVE, AND NOT NEEDED TO FLY - Just as everything in the Minuette's Accessory kit, they not are needed to fly - just to look great in the air and on the ground.

Let's begin construction by working on the port (left) wing of your Minuette.

☐ **Prepare your work area**

You'll need a flat building surface that is a minimum of 36" long. Position the port wing plan over the surface and tape into position. Tear off a length of waxed paper long enough to cover the plan and tape that into position, over the plan.

☐ **Alignment triangles**

Pre-cut into LP4 are a 90° triangles. They can be used to vertically align any of the parts in the construction of your Minuette. LP4 also includes foot pieces that can be used with the triangles to hold them vertically (hands-free).

☐ ☐ **Step 1 - Wing Assembly (wing tip)**

Locate one WS3 from BP5, one WS4 from BP8, and one WS5 and WS6 from BP7.
These are glued together, one at a time to form the wing tip. Start by pinning WS4 in place, then glue WS5 to WS4 and pin it in place. Now do the same for WS6, and finally WS3.

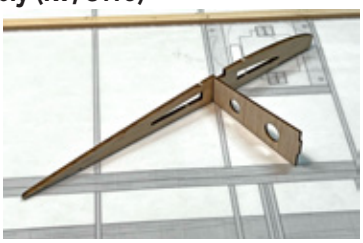
☐ ☐ **Step 2 - Wing Assembly (lower spar)**

Locate one of the 1/8" x 1/4" basswood sticks, as this will be used as the lower spar. Measure and cut it to length - making sure it extends from the inside of the wing tip you just created to beyond the root R3 rib by roughly a 1/4" or so.
Using a few drops of medium CA glue, tack this spar to the waxed paper as shown, and to the wing tip, making sure it is straight along it's entire length - or you can use pins in a criss-cross manner as shown in the photo.

☐ ☐ **Step 3 - Wing Assembly (WS1)**

Now two WS1s from BP10. These are used to form the lower, leading edge sheeting.
Note they have straight and tapered ends. Glue one of the straight ends to the wing tip (WS4) and pin it in position, making sure WS1 is straight and true with the plans.
Now the second WS1 is glued to the first WS1, already place on the board. This time the tapered ends will be glued together forming a scarf joint. Again, pin this in place, making sure it's straight and true with the plans.

☐ ☐ **Step 4 - Wing Assembly (R9, SW5)**



Locate one R9 from BP3 and one SW5 from BP8. Note that SW5 is tapered and has a circle etched in it. This circle indicates the top and outer edges of SW5.
Glue SW5 into the pre-cut slot in R9 as shown here - making sure you pay attention to their orientations.
As you'll do with all of the following steps, make sure that each tab in an SW piece is fully inserted into each rib's slot as the glue cures. Any gaps will add up over the length of the wing and make is so the rib alignment with the plans keeps getting worse and worse.

☐ ☐ **Step 5 - Wing Assembly (R9)**

Now glue the R9 assembly in place, as shown here. Make sure that it is properly aligned with the plans and that it is completely flat on the plans as the glue cures.
Also glue the bottom edge of SW5 to the lower spar.

☐ ☐ **Step 6 - Wing Assembly (WS7, WS8)**

Locate one WS7 from BP7 and one WS8 from BP8.
Remove the pins from the pieces that make up the wing tip, as these two parts will be glued on top of the tip pieces already in place, strengthening them.
First, glue WS7 over the outer portion of the wingtip, and so the ends butt up against the R9 rib.
Then glue WS8 on the rear of the wing tip, between the R9 rib and R8 rib (R8 not yet in place).

☐ ☐ **Step 7 - Wing Assembly (R8)**

Locate one R8 from BP3. It is glued in place, making sure the tab from SW5 is fully inserted, and that the rib is perfectly flat on the plans.

☐ ☐ **Step 8 - Wing Assembly (R6, SW4)**

Now using the same techniques, locate one R6 rib from BP1 or BP2, and two SW4s from BP6.
Note the SW4s are tapered and have a circle etched in them. This circle indicates the top and outer edges of SW4.
Dry fit them first, then when satisfied with how these pieces fit, glue them in place, making sure they're aligned and all tabs are properly seated. The bottom edges of the SW4s should be glued to the sides of the lower spar and the rib should be flat against the plans.

☐ ☐ **Step 9 - Wing Assembly (WS9)**

Locate one WS9 from BP8. Glue this in place between over the rear of the wing tip, between the R8 and R6 ribs.

☐ ☐ **Step 10 - Wing Assembly (R6, SW3)**

Locate another R6 from BP1 or BP2, and two SW3s from BP5 or BP6.
Dry fit them first, then when satisfied with how they fit, glue them in place, making sure they're aligned, all tabs are properly seated and the rib is pushed flat against the plans.

ARE YOU BUILDING YOUR MINUETTE WITH OR WITHOUT AILERONS?
PAY ATTENTION TO THE NEXT SEVERAL OF STEPS!!!!

☐ ☐ **Step 11 - Wing Assembly (R6 or R7?)**

If I could butcher a phrase from the *Talking Heads* for a moment - it's time to ask yourself - are you going to build your Minuette with ailerons or without?

It can easily be flown either way - it's just a question you'll need to quickly answer - *like right now kinda-quick.*

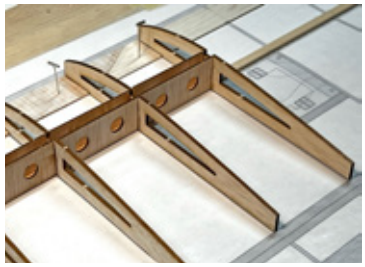
- If you're going to build with ailerons as we show on our prototypes, you'll locate two R7s from BP3.
- If you're a bit aileron-phobic, wanting to go with a simple 3 channel non-aileron setup, then you'll locate two more R6s from BP1 or BP2, and...one A1 from BP5.

☐ ☐ **Step 12 - Wing Assembly (No ailerons?)**

If you chose the 3 channel, non-aileron path, then you'll need to add A1 as part of the trailing edge sheeting. Pin and glue A1 in position butting up against WS3, extending the trailing edge sheeting.

☐ ☐ **Step 13 - Wing Assembly (R6 or R7?)**

Locate four SW3s from BP5 or BP6.



Regardless how you answered Step 10, it's time to install the ribs you selected and the webs. This photo shows the R7s in place (the aileron path).

Dry fit the first rib and pair of SW3 webs first, then when satisfied with how these pieces fit, glue them in place, making sure they're aligned and all tabs are properly seated. The bottom edges of the SW3s should be glued to the sides of the lower spar and the rib should be flat against the plans.

Then do the same for the next rib and the other pair of SW3s.

☐ ☐ **Step 14 - Wing Assembly (WS2)**

Locate one WS2 from BP10. Note the pre-cut slots in its leading edge and the small etched circle on one end.

Pin WS2 in place over the plans so that the notches face the leading edge, and the end with the etched circle is toward the root rib (R3).

If you're NOT using ailerons, then WS2 will also butt up against the end of A1. Pin and glue WS2 in place as shown.

☐ ☐ **Step 15 - Wing Assembly (R6, R4, R5, R4, SW3)**

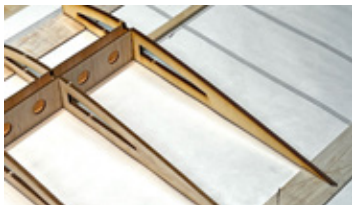
Locate two R6s from BP1 or BP2, two R4s and one R5 from BP1 or BP2. Also locate eight SW3s from BP5 or BP6.

A pair of SW3s and one of the R6's is installed first, using the same techniques as you've used before. Then install another pair of SW3s, R4, two more SW3s, then R5. And finally you'll install the remaining pair of SW3s and the R4.

Again dry fit these first and make sure everything is aligned and all tabs are properly seated. The bottom edges of the SW3s should be glued to the sides of the lower spar and the rib should be flat against the plans with the rear fitting into the pre-cut slot in the rear sheeting (WS2).

☐ ☐ **Step 16 - Wing Assembly (R3, SW3)**

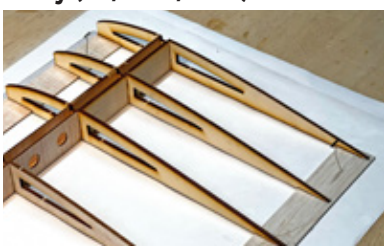
Locate one R3 from LP1, LP2, LP4 or LP5 and two SW3s from BP5 or BP6.



Glue them place as shown with the R3 flat against the plans with R3 rear fitting into the pre-cut slot in the rear sheeting (WS2).

☐ ☐ **Step 17 - Wing Assembly (R3, SW2, SW1)**

Locate two R3s from LP4 or LP5. Also locate a pair of SW2s and SW1s from LP3, LP4 or LP7.

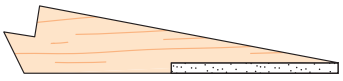


A pair of the SW2s are installed first, then one R3 rib.

Dry fit these first fit and make sure everything is aligned and all tabs are properly seated. The bottom edges of the SW3s should be glued to the sides of the lower spar and the rib should be flat against the plans with the rear fitting into the pre-cut slot in the rear sheeting (WS2) - *this is a recording...*

☐ ☐ **Step 18 - Wing Assembly (A2)**

Locate two of the A2s from BP1, BP2 or BP3. These are glued to the rear of both R6 ribs, to help reinforce the joint where they meet each edge of A1. I don't have a pic for that, but refer to plans and you'll see them there.

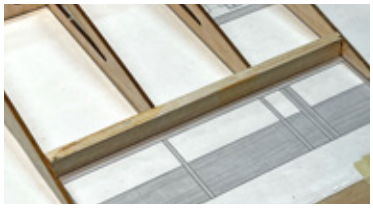


☐ ☐ **Step 19 - Wing Assembly (Leading edge)**

Locate one of the 1/4 x 1/2" x 36 balsa strips. Measure and cut this strip to become the leading edge of the wing. Leave a little extra on each end (roughly 1/4" or so). Also make sure that the 1/2" side is against the ribs when it's attached. Working a little at a time, glue this strip in place to each rib and to the front of the leading edge sheeting and wing tip balsa.

☐ ☐ **Step 20 - Wing Assembly (Ailerons?)**

If, AND ONLY IF, you opted for ailerons, locate another 1/4" x 1/2" x 36" balsa strip.



Measure and cut a length of this to span between the two R6 ribs as shown here. Make sure it's a good, snug fit and the 1/2" side is up against the R7 ribs when gluing in position.

☐ ☐ **Step 21 - Wing Assembly (create dihedral box)**

Now it's time to cut-away the center of the first two R3 ribs.

Following are the before and after photos to help show what needs to be done.

Before cutting

After cutting

Now, before cutting this area away, make sure that the SW1 and SW2's are securely glued to the R3 ribs on the outside of this area - not the inside. This way things won't move as you cut.

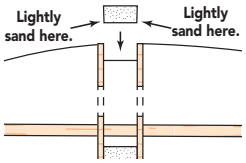
After cutting, make sure that the area is completely clean and smooth, as this will form 3 sides of a box where the dihedral brace will slide through. The cleaner/smoother it is now, the easier it will be to slide in the brace when it's time.

Take your time and use a gentle touch in this step as you don't want to cut/sand/file more than you should, nor do you want to damage the sheer webs in these spots as it could weaken the wing or cause a misalignment.

Note that a Japanese saw is the perfect tool for this job.

☐ ☐ Step 22 - Wing Assembly (top spar)

Locate another length of 1/8" x 1/4" x 36" basswood strip to use as the upper spar. Measure and trim it to length, again, leaving about a 1/4" extra past the root rib (R3). On the wing tip side, you'll need to sand an shallow angle into the piece to obtain a nice, tapered look when attaching it to the top of the wing tip sheeting as shown here.



To install this piece, first lightly sand the edges of the bottom face of the spar as shown in the drawing to the right. This will help the spar slide in easier.

Gluing this in the piece this correctly will take a bit of time, so we recommend against using an instant setting glue. If you are using CA, use a thicker formulation that gives you a bit of working time.

Attach the spar to the wing tip first. Once that glue has cured, or you have secured it with pins, weights, etc., you can work you way down the rib, a little at a time pressing the upper spar into position. This will be a tight fit and might require "wiggling" the spar from side to side to slip in-between the webs. Be sure to press the spar completely into the slot in each rib, making it flush with the webs.

Once the spar is in place, wick thin C/A along the spar to web joints (front and back) along the entire length of the spar.

When fitting the upper spar in the area of the dihedral box, be careful not to drip excess glue into the box formed between R3 ribs.

☐ ☐ Step 23 - Wing Assembly (Ailerons only - S1, S3)

If there's no ailerons in your future, skip this step.

For those of who like ailerons, it's time to build up the frame around the aileron servo's hatch.

Locate one SH1, and one SH3 from LP4 or LP7.

Place (DO NOT GLUE) SH1 in place on the plans, between the ribs and up against the lower spar. Now SW3 will be installed to form the 4th side of the aileron box. It should be snug up against both ribs, and loosely against SH1. I say loosely because you'll want to leave a touch of room to account for the thickness of covering to be applied later.

When satisfied with the fit, glue SW3 in place to the ribs - NOT SW1.

☐ ☐ Step 24 - Wing Assembly (Ailerons only - S2)

Here's another one of those aileron-only steps, so skip ahead of you're aileron-phobic.

Locate four SH2s, from LP4 or LP7. Two SH2s are glued on top of each other, to form a pair of thicker SH2s.

With the SW1 in place from the last step, you'll now set these on top of SW1, up against the ribs and against the web - refer to this photo.

When satisfied with how these are installed, carefully glue them in place to the ribs, the web and where it touches SW3.

But DO NOT GLUE THEM TO SW1.

☐ ☐ Step 25 - Wing Assembly (Ailerons only - A1)

Now it's time to build up the aileron. So if you're into three channels, then sit this one out.

Locate A1 from BP5. To be used as an aileron, it is slightly longer than it needs to be. Sand/trim this piece to it fits in the aileron area with about 1/16" inch clearance on each side of the R6 ribs. Pin this in position.

☐ ☐ Step 26 - Wing Assembly (Ailerons only - A2)

Locate four of the A2s from BP1, BP2 or BP3. These are glued in place to form the "ribs" of the aileron. You'll glue two of them to the outer edges of the A1 sheeting, parallel with the ribs. The the other two should be lined up with the ribs already in place on the main wing (extending the look).

Don't worry about the other two marked on the plans just yet.

☐ ☐ Step 27 - Wing Assembly (Ailerons only - L.E.)

Locate one of the 3/16" sq. x 36" balsa strips. This will be used to make the leading edge and CA hinge supports.

Measure and cut a length to form the leading edge, leaving touch over.

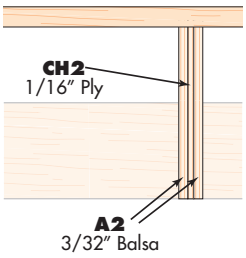
Glue this in place.

☐ ☐ **Step 28 - Wing Assembly (Ailerons only - A2, CH2)**

Locate two more A2s from BP1, BP2 or BP3, as well as one CH2 from LP8.

Now before I start this step, I'm gonna put this out there for your consideration. What you'll form with these three pieces is the control horn of the aileron. Horn itself is made from 3-ply plywood and will be reinforced by wicking thin CA into it.
Although I have not had this happen with any of the prototypes, I will admit that it is possible to break off this horn with rough handling, hangar rash, or just plain bad luck. To repair the aileron in this case, you would have to remove the covering and add scrap wood to form the "seat" for a conventional control horn (not included).
What I'm going to describe works perfectly fine and will last a long time - as long as you take care in the storage and transportation of your Minuette. So, if you're ready, let's get on with it.

Glue one of the two (outer) A2s in place - it doesn't matter which one. Make sure it's parallel with the ribs and in the correct spot - in-line with the servo arm cutout in SH1.

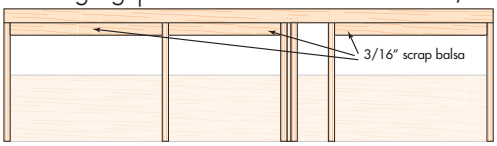


Once the glue has cured, you can remove the aileron from your building board and attach CH2. Note that the long horn on CH2 should protrude out the bottom of the aileron. Glue this in place up against the A2 you just installed. Now glue the remaining A2 in place, up against CH2.
Lastly, using a bit of thin CA, wick it in all around the end of CH2. This will strengthen it even further.

☐ ☐ **Step 29 - Wing Assembly (Ailerons only - hinge support)**

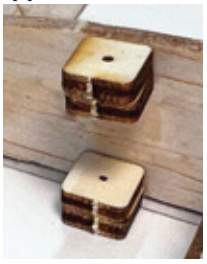
Locate the 3/16"sq. balsa stick you used to cut the leading edge of the aileron. Now you'll cut three additional lengths to form the CA hinge supports inside the aileron, backing up the leading edge.

Cut one piece to fit into the outer gaps on each end. Then the other one should fit into the large gap in the middle of the aileron, as shown in this diagram, and on the plans.

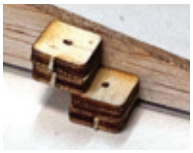


☐ ☐ **Step 30 - Wing Assembly (Anchor supports)**

Locate 16 of WAs from LP4. Glue one on top of the other to form 8 thicker WAs.
Refer to the plans as these are glued into place in 8 different places on each wing half. Start with the bottom 4 first, making sure they are flat against the building surface.
The other 4 will be flush with the top edges of the ribs which means you'll need to angle them slightly.



Also note that the WAs that attach to the rear end of R5 are offset slightly to allow them to fit within the wing's thickness.

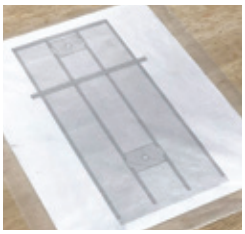


Set the port wing half aside and begin work on the starboard wing half. Tape the starboard wing plan and fresh wax paper on your board. Then follow steps 1 through 30 to complete the starboard wing half. Once finished, then move on to step 31.

Note that when building the starboard half that many of the parts will need to be glued to the opposite side (the WH1, WH2, and the wing tip pieces for instance). Always refer to the plans to make sure you're gluing the parts together in the correct way.

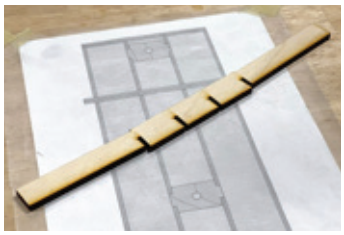
☐ **Step 31 - Wing Assembly (Center section)**

Position the center section of the wing plan on your building surface and tape into position. Tear off a length of waxed paper long enough to cover it and tape that into position, over the plan.



☐ **Step 32 - Wing Assembly (DH1)**

Locate both DH1s They will be glued together to form the wing's dihedral brace.



Note that if there is a bow to these pieces, that's OK. Mix up some 15 or 30 minute epoxy and apply it to the concave surfaces of each DH1. Then carefully align them, weight them down and allow the glue to cure to form a solid, one-piece dihedral brace. Make sure these parts are perfectly aligned and that no glue makes it into four the pre-cut grooves.

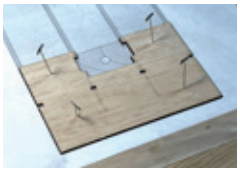
☐ **Step 33 - Wing Assembly (R1, R2)**

Locate both R1s and R2s from LP4. These are to be inserted into the slots of DH1. Carefully sand the slots as necessary to get a good, slop-free fit.

DON'T GLUE THESE IN PLACE JUST YET.
Also note that the two outer ribs (R2s) will be angled as part of the dihedral. Set this aside for now.

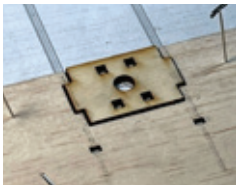
☐ **Step 34 - Wing Assembly (TP1)**

Locate CS2 from BP12. Pin this in place as shown here.

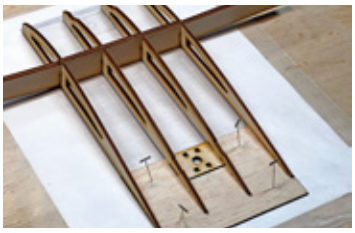


☐ **Step 35 - Wing Assembly (WH5)**

Now locate one WH5 from LP6. Glue it in place, inside the cutout of CS2.



☐ **Step 36 - Wing Assembly (CS2)**

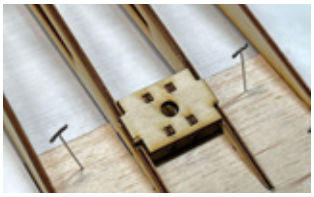


Now it's time to glue the ribs/DH1 assembly in place, on to CH2.
You'll note that each of the ribs has a small tab towards the back. This tab fits into the pre-cut holes on CS2 to help with the alignment.
Make sure the ribs are straight and true and glue them in position, making they're pressed flat against the building surface.

☐ **Step 37 - Wing Assembly (WH7)**

Locate two WH7s from LP4 or LP6.
Note the arrow etched into them, showing which way is up when they're glued in place.
These are glued to the WH5 already in place, making sure they are fully inserted into WH5 and are perpendicular to the building surface.

☐ **Step 38 - Wing Assembly (WH7)**



Locate another WH5 from LP6. This is glued onto the WH7s you just installed, again making sure they are fully inserted on to the WH7s. Note that this piece will sit slightly proud of the rib surfaces - that's one of those design feature things that will make sense in a few more steps.

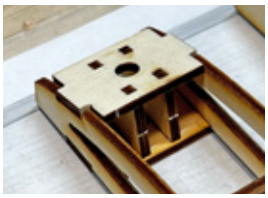
☐ **Step 39 - Wing Assembly (WH5)**

Locate yet another WH5 from LP6. This is glued in place between the two R1 ribs, as shown here. You'll have to carefully bend the ribs slightly to get WH5 to fit in place into the notches of the ribs.
Once satisfied with the fit, glue it in position.

☐ **Step 40 - Wing Assembly (WH6)**

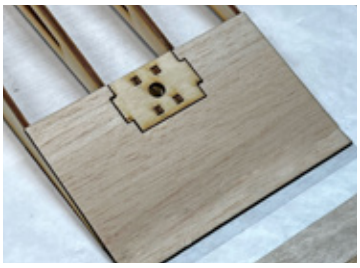
Locate both WH6s from LP6.
Note the arrow etched into them, showing which way is up when they're glued in place.
These are glued to the WH5 already in place, making sure they are fully inserted into WH5 and are perpendicular to the building surface.

☐ **Step 41 - Wing Assembly (WH5)**



Locate the last WH5 from LP6. This is glued onto the WH6s you just installed, again making sure they are fully inserted on to the WH6s. Note that this piece will sit slightly proud of the rib surfaces - that's another one of those design feature things I mentioned earlier.

☐ **Step 42 - Wing Assembly (CS4)**



Locate CS4 from BP11. This is glued in place over the rear portion of this center section.
Make sure it is attached to each of the ribs, WH5 and the CS2 sheet on the bottom.

☐ **Step 43 - Wing Assembly (CF3)**

Locate CS3 from BP11. This is glued over the front part of the center section.
Make sure it is attached to each of the ribs and to the WH5.

Also take the time to glue each of the ribs to the DH1 at this time.

☐ **Step 44 - Wing Assembly (Center sheeting)**

Locate one of the uncut 1/16" x 4" x 12" balsa sheets. Use this to measure, cut and form the center portion of the top sheeting.
Match the grain to the sheeting already installed - so it is cross-grained.
Cut it slightly oversize the carefully work your way down to a proper fit by using a sanding block. Remember you can always take wood off, but it's a lot harder to put back on!
When satisfied on how this piece fits, glue it into place, making sure it's glue to all of the pieces it touches (ribs, DH1, and sheeting).

☐ **Step 45 - Wing Assembly (CS1)**

Remove the center section from your building board and flip it over so you can attach CS1 (from BP12). Make sure it's glued to WH5 and all the ribs.

☐ **Step 46 - Wing Assembly (Center sheeting)**

Locate another of the uncut 1/16" x 4" x 12" balsa sheets. Use this to measure, cut and form the center portion of the bottom sheeting.
Again, match the grain to the sheeting already installed - so it is cross-grained.
Cut it slightly oversize the carefully work your way down to a proper fit by using a sanding block. Remember you can always take wood off, but it's a lot harder to put back on!
When satisfied on how this piece fits, glue it into place, making sure it's glue to all of the pieces it touches (ribs, DH1, and sheeting).

☐ **Step 47 - Wing Assembly (L.E.)**

Locate the 1/4" x 1/2" balsa strip that you used when framing up the ailerons - or if you chose not to use ailerons, grab an uncut piece of the same size strip.
Measure, cut and glue the leading edge of the center section in place as shown here.

☐ **Step 48 - Wing Assembly**

Now its time for the big one - time to fit the port, starboard and center sections of the wing together.

Before trying to slide these pieces together, sand the root ends of each wing half to remove any extra wood and provide a smooth, flat surface.
Then do the same for each side of the center section, taking care not to damage the dihedral brace.

Now, test fit the three pieces together by carefully sliding the braces into both of the wing halves. They should smoothly push into the pockets you the into the wings earlier.
Lightly, and carefully sand the dihedral brace as necessary so it slides in as it should, and allows the R2 and R3 ribs on both halves to fit flat against each other, along their entire length.
Once satisfied with the fit, take the wing sections apart.
Working one side at a time, mix up some 15 or 30 minute epoxy and use it to coat the brace and the entire face of one of the ribs.
When coated, slide these pieces back together. Hold these together with some tape and/or clamps until the epoxy has cured completely. Then repeat this process for the other wing half.
Keep the wings clamped together until the epoxy has Completely cured. You can also wipe away any excess epoxy with a paper-towel soaked in a bit of denatured alcohol.
Note that when completed, the wing will have a bit of flex in it. That's normal and will go away once the wing is covered later on. Just use care when moving it around - slow and steady.

This completes assembly of the Minuette's wing.
Now it's time to start construction of the tail surfaces.

☐ **Prepare your work area**

Now tape the horizontal stab & elevator plan and a fresh piece of waxed paper on your building board.

☐ **Step 49 - Horizontal Stab Assembly (ST5)**

Locate ST5 from BP4. Pin it in place over the plans as shown here.

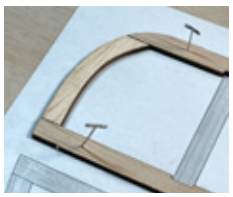
☐ **Step 50 - Horizontal Stab Assembly (ST2)**

Locate ST2 from BP4. Glue it in place, fitting into the ST5's center notch.
Make sure it's positioned the correct way as one end is larger than the other.

☐ **Step 51 - Horizontal Stab Assembly (ST1)**

Locate ST1 from BP4. It is glued in place as shown here, making sure ST2 fits completely into ST1's center notch.

☐ **Step 52 - Horizontal Stab Assembly (ST3)**

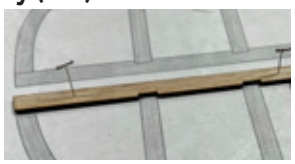


Locate both ST3s from BP4. These are used to form both stab tips.
Glue these in place making sure they are flush with the ends of ST5 and ST1. They also need to be flat to the building surface.

☐ **Step 53 - Horizontal Stab Assembly (ST4)**

Locate four ST4s from BP4. These are the center supports. Glue them in between ST5 and ST1, inserted into the pre-cut slots on each side of the stab.
These also need to be flat to the building surface.

☐ **Step 54 - Horizontal Stab Assembly (ST6)**

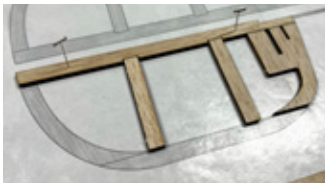


Locate both ST6s from BP4 Pin these in place as the leading edges of the elevator halves.

☐ **Step 55 - Horizontal Stab Assembly (ST7)**

Locate both ST7s from BP4. Pin and glue them in position as shown, flush with the inner ends of ST6.

☐ **Step 56 - Horizontal Stab Assembly (ST8)**

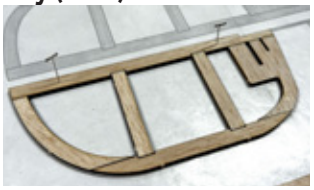


Locate four ST8 from BP3. Glue these into both of the notches on each of the ST6s.
They also need to be flat to the building surface.

☐ **Step 57 - Horizontal Stab Assembly (ST9)**

Locate both ST9 from BP3. These are glued in place to form the outer tips of the elevator halves. They need to be flat to the building surface.

☐ **Step 58 - Horizontal Stab Assembly (ST10)**



Locate both ST10s from BP4.
Glue these in place to form the trailing edges of the elevator halves, making sure that both ST8's are fully inserted into the pre-cut notches.

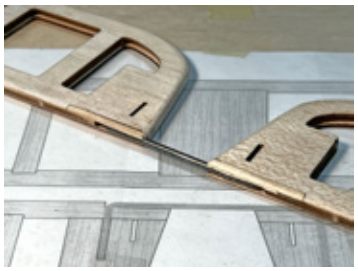
☐ **Step 59 - Horizontal Stab Assembly (Cutout)**

On the plans you'll see where the elevator joiner will be inserted in the elevator halves. However, to do this, you'll need to cut away a small portion of leading edge of each elevator half.
Refer to this photo and to the plans - and you'll get the idea.

☐ **Step 60 - Horizontal Stab Assembly (ST12. ST13)**

Locate both ST12s from BP9 and four ST13s from BP3 or BP13. Remove any pins from the framework, lightly sand the tops of the frames, then glue one ST12 on top of the stab assembly, and one ST13 on top of each elevator half.
When the glue has cured, remove these assemblies and flip them over and lightly sand the framework. Then glue the other set of ST13/ST12 to the assemblies.

☐ **Step 61 - Horizontal Stab Assembly (Elevator joiner)**



Locate the pre-bent elevator joiner from the hardware bag. Make sure that this piece is perfectly flat, and that both bends are at 90° to the center of the wire. Adjust as needed.
Dry fit this into each of the elevator halves, into the groove you opened up when trimming the leading edge. If needed, use a 5/64" drill to carefully open up the groove and remove any glue that may have seeped in. DO NOT CUT THROUGH THE OUTER SHEETING.
Use a bit of medium CA glue to permanently glue the joiner into both halves - making sure the completed leading edge of the elevator is perfectly straight and flat.

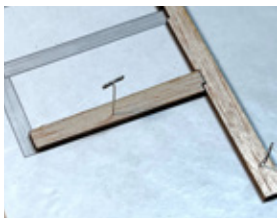
☐ **Prepare your work area**

Now tape the vertical fin & rudder plan and a fresh piece of waxed paper on your building board.

☐ **Step 62 - Vertical Fin Assembly (VF1)**

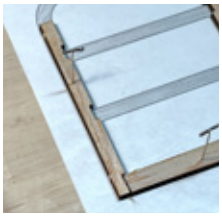
Locate VF1 from BP4. Pin it in position over the plans, taking note of how the plans show where the pre-cut grooves should be placed.

☐ **Step 63 - Vertical Fin Assembly (VF2)**



Locate VF2 from BP4. Note the small circle etched into the upper right corner. That's the corner should fit into VF1 with the circle towards the top of the fin. Pin and glue this in place.

☐ **Step 64 - Vertical Fin Assembly (VF5)**



Locate VF5 from BP4. This is pinned in place and glued to VF2. Make sure you have the orientation correct, with the bottom cutout fully up against VF2.

☐ **Step 65 - Vertical Fin Assembly (VF4, VF6)**

Locate one VF4 and one of the VF6s from BP4.
Pin and glue VF4 to form the top edge of the fin. Then glue VF6 into place to "round-out" the frame.
Round out - see what I did there?!

☐ **Step 66 - Vertical Fin Assembly (VF3)**

Grab both VF3s from BP4. These are glued into place to form the "ribs" of the vertical fin. They should fit into the notches of VF1 and VF5.

☐ **Step 67 - Vertical Fin Assembly (VF7)**

Locate VF7 from BP4. Pin this in place as the leading edge of the rudder.

☐ **Step 68 - Vertical Fin Assembly (VF8)**

Locate the three VF8s from BP4. These are glued in place to form the "ribs" of the rudder. Make sure each is fully seated into the pre-cut notches in VF7. Also that they are flat against the building surface.

☐ **Step 69 - Vertical Fin Assembly (VF10)**

Locate VF10 from BP4. This is glued to the bottom of VF7 to form the bottom edge of the rudder.

☐ **Step 70 - Vertical Fin Assembly (VF9)**

Locate VF9 from BP4 and glue it in place to form the top edge of the rudder.

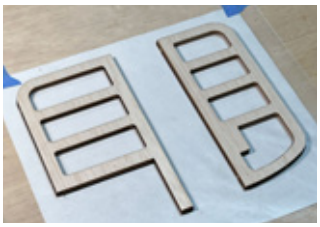
☐ **Step 71 - Vertical Fin Assembly (VF11)**

Locate VF11 from BP4. This is the rear frame of the rudder and should be glued in place. Note it's orientation when it's attached and make sure that each of the VF8s are fully inserted into VF11's precut notches.

☐ **Step 72 - Vertical Fin Assembly (VF6)**

And finally locate the other VF6 from BP4. Make sure it's glued in-line with VF11 and VF9. This "rounds" out the top of the rudder and "rounds" out the framing of the rudder.
Yup, I'm here all week folks!

☐ **Step 73 - Vertical Fin Assembly (VF12, VF13)**



Locate both VF12s from BP8 and both VF13s from BP10.
Remove any pins from the framework, lightly sand and then glue one VF12 on top of the fin assembly, and one VF13 on top of each rudder framework.
When the glue has cured, remove these assemblies and flip them over and lightly sand the framework. Then glue the other set of VF12/VF13 to the assemblies.

This completes the assembly of the tail surfaces.
Now it's time to assemble the fuselage.

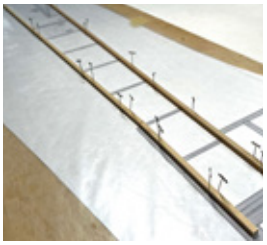
☐ **Prepare your work area**

Now tape the fuselage side-view plan and a fresh piece of waxed paper on your building board.

☐ **Step 74 - Fuse Assembly (bottom longeron)**

Locate one 3/16" sq. x 36" basswood strip. This are used to form the lower edge of the fuselage side frame.
Note that there is a "break" in the area above the leading edge of the stab. You'll need to measure and cut the length from the firewall to this "break", then measure and cut the remainder to fit from this "break" to the rear of the fuselage. Slightly bevel the pieces where they meet at this "break" for a good fit.
When satisfied, pin these in position making sure they are arrow-straight along their length. Also glue the two pieces together at the "break".

☐ **Step 75 - Fuse Assembly (top longeron)**

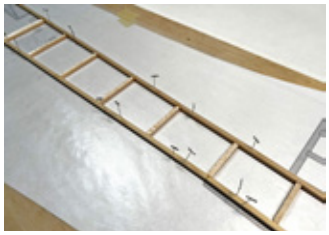


Locate another 3/16" sq. x 36" basswood strip. This will be the upper edge of the fuselage side frame.
Measure cut and pin this in position making sure it is arrow-straight along the entire length.
Do not cut out the area around the wing saddle at this point - leave it as one continuous piece.

☐ **Step 76 - Fuse Assembly (framing)**

Using scrap 3/16" sq. basswood from the previous steps, cut a piece to go between the top and bottom longerons, just behind the firewall.
Bevel both the edges for a good fit then glue in position as shown here.

☐ **Step 77 - Fuse Assembly (framing)**

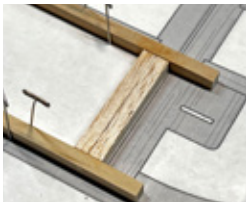


Locate one of the 3/16" sq. x 36" balsa sticks, or if you built ailerons, start with the leftover piece first.
You'll use this piece to cut and fit all of the vertical fuselage supports, starting at the two pieces that are doubled up about an 1" back from the wing's trailing edge.
Carefully measure, cut and bevel each piece for a nice, proper fit and glue each in position as you go along. They should all be nice, straight and flush with the longerons. Take your time and make it something you can be proud of. *Remember, that most of this will visible when the Minuette is completed, so make it count!*

☐ **Step 78 - Fuse Assembly (framing)**

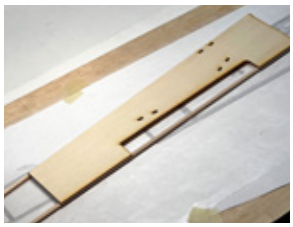
When you reach the aft end, the 3/16" framing is doubled here.

☐ **Step 79 - Fuse Assembly (sanding)**



Remove any pins, then lightly sand the surface of the framework to remove any excess glue and so prepare the surface for the next step.

☐ **Step 80 - Fuse Assembly (FS1)**



Locate both FS1s from LP1 and LP2. These are lite-ply and chances are that because of their length, they will have slight bows in them. To help with this, these two parts are cut from the same piece of lite ply, but mirrored and here's why.
First, the amount of bow should match between the two.
Secondly, when you place these next to each other (along their top edges), the concave surfaces can be placed up against the framing, therefore minimizing this bow almost completely.
So, let's do that now.
FS1 fits over the front part of this framing. Match whichever FS1 has a concave curvature when aligned this framing and you'll glue it to the framework. We'd recommend some medium or thick CA to give you longer working time. Apply glue to all of the framing that this FS1 will cover, then press the FS1 in place, making sure it's perfectly aligned. Use weights to keep FS1 flat as the glue cures.

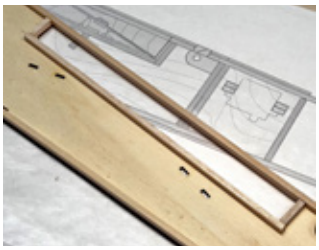
☐ **Step 81 - Fuse Assembly (starboard framing)**

Once the glue has cured from the previous step, carefully remove the framing you've created and set it aside. This is the port side and now you'll take most of same steps to create the starboard side.

Go back to Step 74 and make the framing - which will take you through step 79 - skip 80, then come back here.

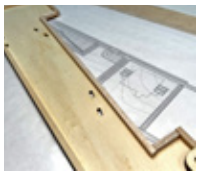
Once framed up, carefully remove the starboard framing and flip it over. Lightly sand this face to remove any extra glue, wax paper, etc.
Double check that you have indeed flipped it over and will be making a mirror of port side you created. This needs to be a starboard side.
Now glue the remaining FS1 in place to complete the starboard framing. Weight it down as the glue cures.

☐ **Step 82 - Fuse Assembly (Wing saddle)**



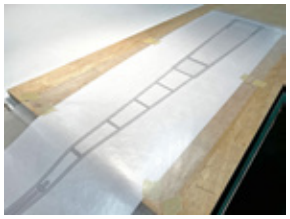
Place both side frame assemblies with the plywood sides on the buildilng surface - the framing sides up.
In the wing saddle area use more of the leftover 3/16" sq. balsa to cut the two small uprights and the long horizontal piece to frame out the saddle.
Make good clean cuts and glue all these pieces in place - again on the framing side of the sides. Also make sure that the horizontal piece is straight along the cut edge of the plywood FS1.

☐ **Step 83 - Fuse Assembly (Wing saddle)**



Once the glue has cured from the previous step, cut away the top portion of 3/16" sq. basswood that is spanning the wing saddle's opening. Do this for both the port and starboard frames. Sand these cut edges smooth to match the plywood.

☐ **Prepare your work area (plans - top view)**



Now tape the fuselage top-view plan and a fresh piece of waxed paper on your building board.
Note that as we've shown here, it's best to allow the back portion of the plans (where the "break" in the bottom formers is) to fall off the end of your building board - the fuselage side frames won't sit flat because of this break.

☐ **Step 84 - Fuse Assembly (plans - top view)**

Locate FB from LP5. This is the bottom of the forward fuselage. If it does have a bow in it, allow the bow (concave side) to face up as you pin it in position around it's perimeter, as shown here.
Now you'll attach the left fuselage framing to FB. Working and gluing a little bit at a time, make that the framing runs true along the length of FB.
Also use the triangles we provided (noted way, way, way back at the beginning of this manual), as they will help you guarantee that the framing is held exactly perpendicular (90°) to FB.

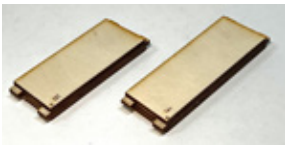
☐ **Step 85 - Fuse Assembly (F2)**

Locate F2 from LP4. This is glued in place, locking in just forward of the doubled-up framing as shown here.

☐ **Step 86 - Fuse Assembly (LG1. LG2)**

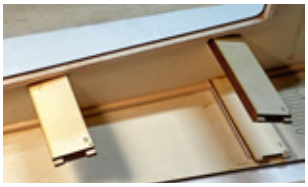
Locate LG1 from LP1 and both LG2s from LP1 and LP2. They all have an etched circle designating the side which should face forward. Glue one LG2 on top of the other, then glue that sub-assembly onto the fuselage floor (FB) - centered up under the holes for LG1 as shown here.
Then glue LG1 on top of the LG2s, making sure it's aligned properly when by fully inserting both tabs into the pre-cut holes on the fuselage side.

☐ **Step 87 - Fuse Assembly (WH1, WH2, WH3, WH4)**



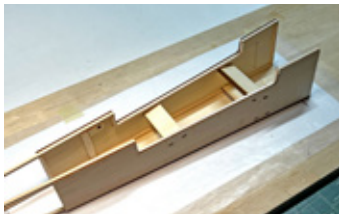
Locate WH1, both WH2s and WH3 from LP3. Also locate both WH4s from LP2.
These all have the circles etched which designate what?
Yup, the front edges - so listen up - here's what we're gonna do.
First you're gonna make an WH1 sandwich with WH2 bread. Get it?
Make sure the pieces are centered up with each other as the glue sets, then make another sandwich with WH3 in the center and WH4 for the bread.
Hold the mayo on both. I'm a mustard man myself.

☐ **Step 88 - Fuse Assembly (WH1, WH3 sandwiches)**



Now its time to glue these two sandwich assemblies into the fuselage as shown here.
The WH1 group goes toward the front, with the WH3 group just behind.
Make sure they are in the correct orientation by using the.... the.... *come'on, you know this one.* The.....etched circle, that's right. Also make sure they are each pushed fully into the fuselage side sheeting.
Note that the tabs will extend past the outer edge of the side sheeting, so when sanding later it will give a better looking finish.

☐ **Step 89 - Fuselage Assembly (starboard side)**

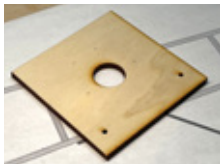


Locate the starboard fuselage side as it's time to glue it to the fuselage assembly.
For the most part, this will be held perpendicular without the use of the triangles, but have those nearby, just in case you need them.
Dry fit this first as there's a lot of things to get right. The side should be resting on top of the bottom sheeting, then the tabs for the LG1, WH1, and WH3 should be fully inserted into the pre-cut holes in the side sheeting Also F2 needs to be in place, up against the uprights.
When you're satisfied how this goes together, remove it apply glue, then carefully glue this side piece in place. Make sure everything stays aligned and the side is straight along the entire length of the bottom sheeting.

☐ **Step 90 - Fuse Assembly (cross bracing)**

Locate one of the 3/16" sq. basswood pieces you cut away from the wing saddle areas. Measure, cut and glue in two cross braces for the front of the fuselage.
One will go across the bottom, glued to the sheeting and side framing. The other will spanning the distance between top of the fuselage sides.
Make sure the fuselage sides are parallel in when doing this.

☐ **Step 91 - Fuse Assembly (F1)**



Locate both F1s from LP1 and LP2. Note there one large and two smaller cutouts in each, as well as an "X" pattern etched into the center.
Mix up a bit of epoxy to glue these two pieces together, making sure that at least one of the "X" etched faces is visible. Both pieces should be perfectly aligned and clamped/weighted-down while the glue cures.
Remove any excess glue from the center cutout as well as the two smaller holes.

☐ **Step 92 - Fuse Assembly (F1)**

Before attaching the F1 (firewall) to the front of the fuselage, take a few minutes to sand the front face of the fuselage smooth. Remove the fuselage from the board first, then go over it to remove any excess glue, framing, etc.
Once sanded, its time to attach the F1 assembly to the fuselage. Mix up some epoxy and apply it around the edges where F1 contacts the fuselage framing and side sheeting.
Attach the firewall, making sure the two small holes are towards the bottom, and the etched "X" faces outwards. Use tape or clamps to hold this securely in place until the glue cures.

☐ **Step 93 - Fuse Assembly (upper cross-framing)**

Using more of the 3/16" sq. balsa sticks, it's time to measure, cut and glue in some of the upper cross-framing.
Attach the piece across the rear of the wing saddle, the doubled-up pieces just aft, and then the piece that's at the rear of the side sheeting.

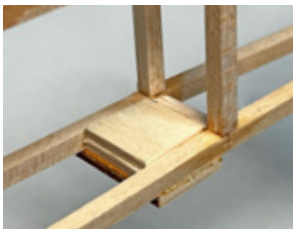
☐ **Step 94 - Fuse Assembly (align fuselage sides)**

This is gonna look a little strange, but it really helps to align the fuselage sides, and keep them that way while you install the rest of the fuselage cross-framing.
Locate the vertical fin you made way, way back. Tape this in place at the back of the fuselage, between the side frames like is shown here. Eye down the length of the fuselage to make sure that both sides have a nice, straight taper back to this point - *no banana-shaped stuff here please*. Now, be careful over the next couple of steps because you don't want to break off the fin before you get a chance to use it!

☐ **Step 95 - Fuse Assembly (cross-framing)**

Using more of the 3/16" sq. balsa stick, now measure, cut and glue in the rest of the fuselage cross-framing. Remember that matching sets of braces goes on the top and bottom, so take your time and get this right. Again, this part will show, so make yourself proud here.

☐ **Step 96 - Fuse Assembly (Tail-skid mounts)**

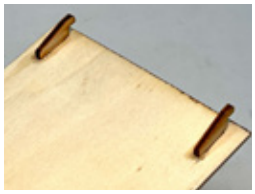


Locate LG3, both LG4s , LG5 and both LG6s from LP6. LG3 and LG4 make up the forward mount, with LG5 and LG6 making up the aft mount.
Note that these all have etched circles which - say it with me.....marks the front edge.....nicely done.
Refer to the plans as for the exact placement of LG3 and LG5 as they are attached first, glued to the bottom of the fuselage, with their outer edges flush with the outer fuselage framing. Then the pairs of LG4 and LG6 are glued on top, in between the fuselage framing to thicken up these mounts.

☐ **Step 97 - Fuse Assembly (H6, H7)**

Locate all of the H6s and H7s from LP5.
They might look the same, but there's a slight difference between the two parts, so don't mix them up.
These pieces are will be used as attachment points for the back two fuselage hatches.
Let's start with the H6s first. You can either glue two of them on top of each other, then glue them in place, or glue one in place on the fuselage, then the other below it - your call.
What you're shooting for with the H6s is to have them in the front two corners, up against the side and cross-framing. And at the same time, flush with the side sheeting. Do the top two, then flip the fuselage over and glue in the bottom two.
The use the same technique to glue in the H7's into the rear spots - two up top, two below.

☐ **Step 98 - Hatch Assembly (H1, H2)**



Locate H1 from LP7 and both H2s from LP5.
If there's a bow in H1, it's best to have the concave side face up because it will act more as a "spring" to help hold the latch tight against the fuselage later on.
So now that you're armed with this valuable knowledge its' time to attach both H2's. The should be attached to the underside of H1 by gluing them into the pre-cut slots towards the front of H1. Make sure H2's tabs are fully inserted into H1 and the "hooks" face the front of H1, as shown here.

☐ **Step 99 - Hatch Assembly (H4)**

Locate H4 from LP7 and H3 from LP4.
H4 serves as the "instrument panel" on the hatch and H3 supports it.
H3 has an etched arrow pointing which way is up, and coincidentally to the edge that should be glued to H4. But before doing that, sand a bevel into the base of H4 as shown here. It should be even across

the width and allow it to properly fit when attached to H1.

Dry fit these parts together and see how things fit. Sand if needed to make sure everything looks good, then glue these two parts to the top side of H1, making sure that H4 slants toward the front of the hatch.

☐ **Step 100 - Hatch Assembly (framing)**

Draw a line across the front of the top of the hatch, at the front of both H2 cutouts. *(I know, the H2's aren't shown in this pic, but pretend they're there).*

This line will serve as the front measurement of the strips you're about to cut.

Locate both of the 1/8" sq. basswood strips. Measure, cut and glue the center length of framing as shown here. You'll need to sand a bevel into the front edge to allow it to smoothly blend into the hatch surface.

☐ **Step 101 - Hatch Assembly (framing)**

Using more of the 1/8" sq basswood, measure cut and attach the two pieces on either side of the center piece you just installed.

☐ **Step 102 - Fuse Assembly (framing)**

The last two outer pieces go from H4, to 1/2" in back of the H2 cutouts. These pieces should be glued in so they form a straight line from H4, to these cutouts, as shown here.

Again taper the forward ends into the hatch.

☐ **Step 103 - Hatch Assembly (sheeting)**

Locate two of the uncut 1/16" x 4" x 12" balsa sheets. These are used to form the outer skin halves of the hatch.

As the sheeting we get can vary in density, you will probably have to apply a bit of Windex® glass cleaner to loosen up the grain. Soak the outer side of the wood to expand the fibers. Now hold it to curvature needed, then use a hair dryer or covering heat-gun to help "set" the balsa's bend as it dries. Once dry, the you can start to measure and cut as needed to complete one side of the sheeting.

Use a bit of masking tape to hold it in position along it's entire length as you glue it to the hatch.

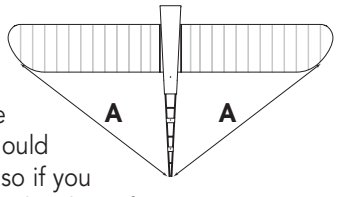
Then glue it to the side of the hatch, the basswood strips, and the front of the hatch as we shown here.

Now follow these same steps to form the sheeting for the other side of the hatch. Note that you'll need to mirror the first sheet's curve when you set-in the curvature for the second sheet, so it will fit properly.

☐ **Step 104 - Fuse Assembly (attach the wing)**

OK, now it's time to fit the wing to the fuselage and drill the holes for it's mounting screws.

Before you can sit the wing into the fuselage's wing saddle, you'll need to sand the leading edge of the center section to round it a bit. You'll see the curvature in the front part of the wing saddle that you'll want to match.



Check the fit of the wing into the wing saddle of the fuselage. It should drop in without much resistance, so if you need to, lightly sand the leading and trailing of the wing a little to get a nice fit.

When finished, center the wing's center section into the saddle. Now align the wing properly to the fuselage by adjusting as needed so that distance from the port wing tip to the rear of the fuselage is the same the distance when measured from the starboard wing tip to rear of the fuselage.

☐ **Step 105 - Fuselage Assembly (drill wing bolt holes)**

With the wing aligned, drill two 3/16" holes for the wing bolts, using the pre-cut holes the WH5s as a guide. Before powering up, position the drill down through these holes and only then turn on the power to cut down through the WH1/WH2 and WH3/WH4 sandwiches in the fuselage.

Use caution to make sure the wing does not move until both holes are drilled.

When drilling, take your time and make sure the drill is held so the bit is in the center of the wing holes. This will guarantee that the holes drilled will be perpendicular with the wing's sheeting.

This will make it so the wing bolt goes in at an angle, but the wing bolt's head will be flat on the wing surface. Remove the drill, remove the wing and clean up around the new holes you drilled.

Run a 1/4x20 tap through the WH1/WH2 and WH3/WH4 sandwiches so that the wing bolts will thread into these blocks. A few drops of thin CA will help strengthen and secure the threads you've cut in these holes. We've found this to be a very secure way of holding the wing in place for all of our prototypes, but... if you don't want to go this way, you can also use 1/4x20 t-nuts (not included).

☐ **Step 106 - Fuse Assembly (Vertical fin)**

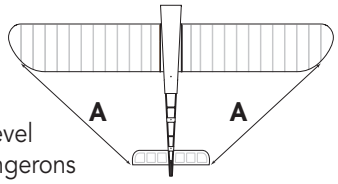
With the wing still attached, focus now moves to attaching the tail surfaces. The first thing is the vertical fin. If you still have it taped to

the rear of the fuselage, remove the tape.

Now place the vertical fin in position and "eyeball" down the fuselage. With the fuselage sitting flat on your building surface, the vertical fin should point straight up. If not, remove the fin and sand the inside edges of the rear of the fuselage to adjust as needed. Once you're satisfied with the position, glue the fin in position, making sure it's glued to the fuselage framing on both sides, as well as the front cross-framing which should be in place below the fuselage longerons. You can also fill the gap between the rudder the top of the fuselage framing with some scrap 3/32" balsa sheeting.

☐ **Step 107 - Fuse Assembly (Horizontal stab)**

With the fin in place, now it's time to attach the stab. Again, with the wing attached, you'll need to position the stab so it's centered on the fuselage and level with the wings. Sand the rear longerons as needed to make sure the stab is level, then adjust the stab side-to-side for the correct alignment.



The distance from the port stab tip to the port wing tip should be the same as the starboard stab tip to starboard wing tip.

When you have it in the correct spot, use a pencil to draw some alignment marks onto the stab, where it intersects the fuselage. Then remove the stab, apply some glue and attach it permanently right back in the place it was.

☐ **Step 108 - Wing Assembly (FS3)**

While the wing is still on the fuselage, let's do a couple of finish items.

Looking down from the top, use a pencil and straight-edge to lightly draw a line onto the wing's center section sheeting, denoting a continuation of the fuselage's outer edge.

Now locate both FS3s from LP6. These are glued in place - TO THE WING ONLY, as shown here - following the line you just drew. The piece should be flush with the aft saddle opening and extend to just shy of the wing spars. Do this for both sides.

☐ **Step 109 - Wing Assembly (FS2)**

And now locate both FS2s from LP5. These are also glued in place - TO THE WING ONLY, as shown here - following the line you drew. This time these pieces will be flush with the forward edges saddle opening and extend to just shy of the wing spars. Do this for both sides,

☐ **Step 110 - Wing Assembly (F3, F4)**

Locate F3 from LP6 and F4 from LP5. F3 is used to span the open space between the two FS3s, and F4 is used between the two FS2s. Dry fit these first, sand as necessary, then lightly tack these in position to the wing and to the FS3/FS4 parts. NOT TO THE FUSELAGE.

When the glue has cured, lightly sand the top of the wing saddle area to make sure all of the pieces you just glued in are flush with the top framing of the fuselage.

You can now remove the wing from the fuselage. Now go back and add a bit of reinforcing glue to FS2, FS3, F3 and F4 joints. Now set the wing aside.

☐ **Step 111 - Hatch Assembly (Latch)**

Grab the hatch that you created several steps back. Also locate the 4-40 x 1 socket head cap screw, three 4-40 lock nuts, five #4 washers, and the 4-40 nut from the hardware bag. Also grab both L1s from LP8. These are all used to create the latch for the back of the hatch area. Your mileage may vary, but all of our prototypes this combination of components, in this order worked quite well:

Place 2 washers on the 4-40 x 1 screw.
Then one L1.
Then another washer.
Now turn a lock nut all the way down the screw's thread, to hold these parts together - but don't crush them.
Tighten the nut tight enough so L1 won't be able to spin on it's own.
Add one more washer, then push this all through the top of the hatch, into the pre-cut hole.
Now add one more washer, then thread on another lock nut. Thread the nut on so it's snug, but not tight. You want this assembly to move, but not be sloppy-loose.
Then thread the last lock nut on a little ways, and then the other L1.
Lastly, add the 4-40 nut and tighten it so it holds L1 firmly to the lock nut.
We found it best of both L1s point the same direction, so you'll it's easy to tell when the hatch is locked from the outside.

☐ **Step 112 - Hatch Assembly (Latch)**

Now test fit the hatch to the fuselage. You'll notice that the aft end of the hatch can move side to side a bit, so let's fix that.
Center up the hatch on the fuselage and make sure it's pushed forward, up-against the back of the firewall. Temporary tape it in position.
Now you need to use a pencil to mark a line of the bottom of the fuselage, where F2 touches it. Remove the hatch from the fuselage.
Locate a bit of the 1/8" sq. basswood you used for the hatch framing. Cut a piece that's roughly about 2" long and glue it to the hatch, just forward of the line you just scribed, making sure it's centered on the hatch.

☐ **Step 113 - Wing Assembly (Aileron exit)**

If you're flying with ailerons, cut a hole in the middle section, similar to what's shown here. It's also shown on the plans. This is allow the aileron wires to exit the wing.

☐ **Step 114 - Sanding**

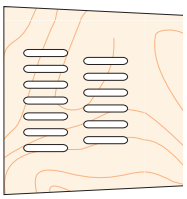
Now is the time to get quite familiar with the sanding tools of your choice. Take the time to perform a good sanding, rounding the wing's leading edge and blending it into the wingtips. Go over the entire wing, making sure the everything is smooth.

Round the trailing edges of the stab, elevator, fin and rudder. Round the leading edge of both elevator halves, the rudder, and the ailerons.

Although you could round off the edges of the fuselage framing, we prefer to leave them squared off. Just lightly run over them to make sure they're smooth and uniform.

The idea is to spend some time caressing this airframe you've created, smoothing the rough edges until it's something, beautiful and ready to cover.

☐ **Step 115 - Electric air exits**



If (and only if) you are powering your Minuette with an electric power system, pop out the elongated cutouts in the bottom fuselage sheeting, close to the firewall to allow cooling airflow in over the battery and ESC.

However, if you're going with glow power, use a bit of glue to seal these cutouts in place as you don't want exhaust and dirt getting into the fuselage.

☐ **Step 116 - Fuse Assembly (Main gear)**

With the wing removed, place the fuselage upside down (be careful of the vertical fin).

To assemble the main gear, you'll need to locate the port and starboard main struts, the axle, the two gear straps and four of the 2-56 x 3/4" self tapping screws.

Using an 1/8" drill, clear out the two small pre-cut holes in the firewall. Then push the port and starboard struts completely into these holes.

Now you'll drill the holes for the landing gear straps. Working with one strut at a time, gently pull the aft "flat" of the strut rearwards just a little to add a bit of tension to the wire. Then place the strap over the back portion of the wire, as shown in this photo, while holding this tension. Mark and drill the mounting holes with a 1/16" bit. Now you can attach the strap with two of the 2-56x3/4" self tapping screws. Do the same for the other strut.

☐ **Step 117 - Fuse Assembly (Main gear soldering)**

With the struts mounted, lightly sand both struts where the axle will be attached, and also clean the axle.

After cleaning, offer up the axle to the struts, centering it on the airframe, and making sure that the struts are straight and parallel when doing this.

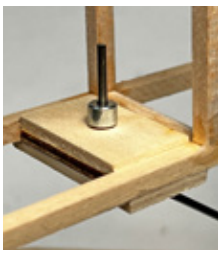
Now, working on one strut/axle joint at a time, carefully and tightly wrap the joint with wire as shown here. We used 26 gauge wire (not included), but other thicknesses can be used.

Lightly brush on a bit of flux over the wire-wrap, then use a small torch (or a soldering iron) to securely solder the wire wrap in position, securing the strut and axle into a solid, one piece unit.

Take care of your surroundings when doing this as to not set the fuselage, or anything else on fire.

When finished, do the same to the other strut and you should have something like this when finished.

☐ **Step 118 - Fuse Assembly (Tail-skid)**



Locate the pre-bent tail-skid, two of the 3/32" wheel collars and set screws.

While the fuselage is upside-down, you can mount the tail-skid in position. Use a 5/64" drill to clear out the pre-cut hole in LG3 and LG5. Then you push the ends of the tail-skid into the fuselage.

Note, the tail-skid can be held in with the collars and set screws - or you can slightly tighten up the skid's bend so it will be held under tension when pushed into place.

This completes assembly of the Minuette airframe. These next few steps can be done in most any order - up until it's time to cover.

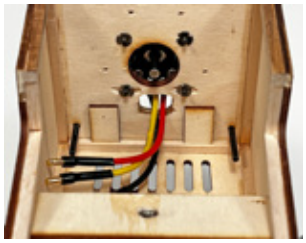
Power system

Installing your power system of choice is up next. As I mentioned up-front, the Minuette was really designed as an electric powered aircraft, mainly because of the large firewall area makes it difficult to mount a typical 2-stroke engine without a bunch of muffler extensions. 4-strokes could work better, if you have one in this small range.

Electric power

There's a lot of choices out there for electric power, but we've reached out to Innov8tive Designs for their recommendations on power. You'll see those on our website for both their different brands. We used one of their Cobra setups on our prototypes.

The motor's cross mount should be installed exactly on 45-degree lines with respect to the center of the firewall. We've etched this "X" pattern into the front of the firewall to help you line things up. Also, note that if you're going to install our Anzani 3D dummy motor from our optional Minuette Accessory Kit, you MUST have the motor mounted with the cross mount in a "+" orientation instead of an "X" orientation, these cutouts in the dummy motor will not line up.



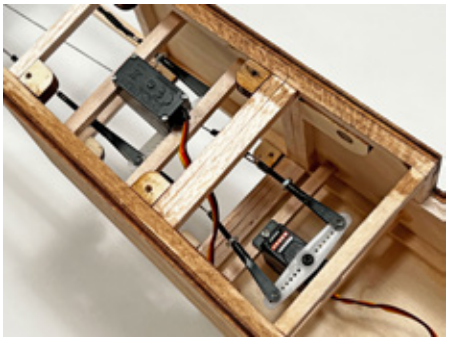
You'll also need to make a hole underneath the motor to allow the motor's wires to pass through the firewall, into the fuselage.

Battery /Tank Tray (TR)

Located on LP7 is TR. This is the battery/tank tray. This is glued in place at somewhat of an angle - see plans for what I'm on about. The front of TR will be up against the firewall and should be supported with a couple scraps of balsa. It should be glued to the firewall, to these support scraps, and to where it touches LG1 and the fuselage floor.

You'll also see a bit of hook and loop (not included) which we use to hold the battery securely in place.

Control horns, servo & pushrod installation



Although you can install the servos and control hardware after covering your Minuette, we find it easier to temporarily mount everything in place before covering. This way you have unblocked access inside the fuselage and wings to get the servos, extensions, and pushrods in place.

These photos shown examples of servo installation in one of the Minuette prototypes. As you can see, we've used Dubro's 2-56 pull-pull setup for the elevator and rudder and it works very well. You can use other systems, but a pull-pull system will look best as it's more "period correct".

We used some of the leftover 3/16" sq. basswood to form the servo mounting beams inside the fuselage.

Servo Hatches (H5)

Located on LP5 are both H5s. These hatches are attached to the top and bottom of the fuselage, covering the servo bay. Using the H5s as a guide, use a 1/16" drill bit to drill through the H6 and H7s already installed.

Then use four 2-56x3/4" self tapping screws to hold on each of the hatches.

Tail Surface Control Horns (CH1)

As I mentioned up-front, included in the Minuette are laser-cut control horns, cut from 3-layer plywood - CH1s from LP8.

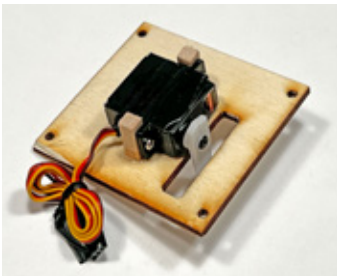
Although I have not had this happen with any of the prototypes, I will admit that it is possible to break off these horns with rough handling, hangar rash, or just plain bad luck. To repair them would involve having to remove the covering and add wood to form the "seat" for a conventional control horn (not included).

Using CH1s and wicking in thin CA to reinforce the ends works perfectly fine and will last a long time - as long as you take care in the storage and transportation of your Minuette.

If you choose to use them, these will fit into the pre-cut slots in the rudder, and into one of the elevator halves. Make sure it's inserted so it's equal on both sides, not cocked to one side or the other.

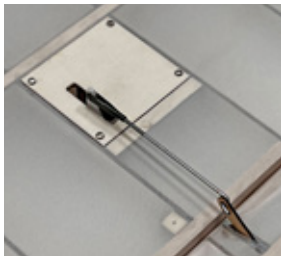
Lastly, using a bit of thin CA, wick it in all around the ends of CH1. This will strengthen them even further.

Aileron Hatches (SH1)



When mounting the aileron servos to each of the SH1's you'll need to cut a few 3/4" lengths of the 3/16" sq. basswood scrap. Make four thicker mounting posts by laminating two pieces together then sand the ends flat.

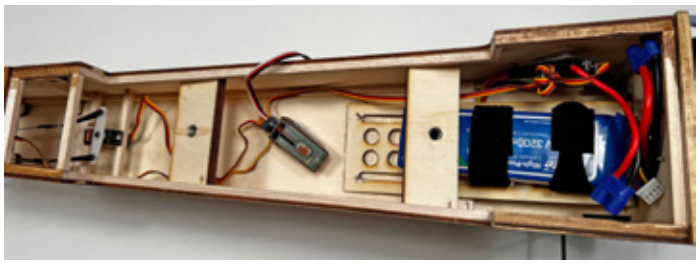
Position your aileron servo on the inside of the aileron hatch so the servo arm output shaft is centered in the opening.



On the inside of each aileron hatch, glue one post on each side of the servo as shown in the photo.

Note that the left hatch is a mirror image of the right hatch.

Now fit the servo hatches into position on the bottom of the wing. Using the pre-cut holes as a guide, drill four 1/16" mounting holes into the basswood mounting posts you just installed. Harden the wood with a bit of thin CA and you can use the supplied 2-56 x 3/4" self tapping screws to secure the hatches in place.



Finish the layout of your radio gear by adding the receiver, flight pack battery, ESC, and the switch (if using one). We mounted the receiver to the tray by using a bit of self-adhesive hook-and-loop (not included). The ESC was mounted to the inside wall of the fuselage in the battery area.

Covering

Now it is time to cover the Minuette. Remove the power-plant, main gear, pushrods, and any other components that would get in the way of applying the covering.

Double check that all surfaces are smooth and ready to cover. Sand as necessary, then cover the entire airframe with the covering/finish of your choice.

To cover the Minuette as shown in our prototypes takes a complete 2 meter roll of covering, carefully cut and used.

When the covering is complete, re-attach all the components you removed earlier in this step.

Logos, numbers, etc.

If you want to use graphics similar to the ones we used, Old School Model Works has teamed up with Callie Graphics as a supplier for pre-cut vinyl. They are a very well known provider of custom graphics for R/C models.

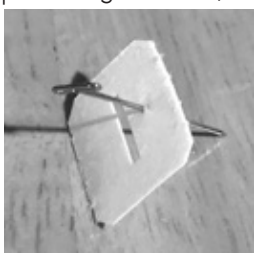
We have supplied them with the artwork needed and you can order straight from them, choosing the colors that work for you. Contact Callie Graphics at this link: https://callie-graphics.com or scan the QR code.

Note that Callie Graphics is not affiliated with Old School Model Works, nor does Old School Model Works generate any income from this partnership.

Attach the Control Surfaces

Now is the time to attach all the control surfaces to the airframe, by gluing the hinges in position with thin C/A. We've noted suggested hinge locations for each of the control surfaces on the plans.

When using the CA hinges, first push a pin through on side, at the center of the hinge as shown here. This will keep the hinge centered as it's pushed into the surfaces. When you've got all the hinges for a surface in place, then remove the pins and glue the hinges in place with a few drops of thin CA.



At the bottom of this page is a guide on how to cut the CA strips into individual hinge pieces.

Attach wheels

Use the included 1/8" i.d. wheel collars to hold each wheel (not included) on the axles. For a maintenance free installation, file a small flat on the axle where the set screw of the wheel collar touches. Also use a touch of thread-locking compound to keep the screw from loosening over time.

This completes the assembly of the Minuette. Now you'll need to adjust the control throws and check for balance.

Recommended C.G. setting:

An important part of preparing the aircraft for flight is properly balancing the model. This is especially important because of the various motor/battery combinations that can be used.

CAUTION! DO NOT SKIP THIS STEP!

The recommended Center of Gravity (CG) range for the Minuette is 3" from the leading edge of the wing, and you'll see this marked on the fuselage plan with this symbol.

If necessary, move the battery, receiver, and/or add weight to either the nose or the tail until the correct balance is achieved. Stick-on weights are available at your local hobby store and work well for this purpose.

C.G. BALANCE POINT

We recommend balancing it at the forward point for the first flights, then moving it backward if you'd like it to be a little more maneuverable.

Recommended Control Throws:

The amount of control throw should be adjusted as closely as possible using mechanical means, rather than making large changes electronically at the radio.

By moving the position of the clevis at the control horn toward the outermost hole, you will decrease the amount of control throw of the control surface. Moving it toward the control surface will increase the amount of throw. Moving the pushrod wire at the servo arm will have the opposite effect: Moving it closer to center will decrease throw, and away from center will increase throw. Work with a combination of the two to achieve something relatively close to these throws that are good for everyday sport flying. If competing in pattern, you'll probably want to dial these down a bit to give a smoother appearance to your maneuvers.

Aileron 3/8" up/down (25% expo)

Elevator 1/4" up/down (20% expo)

Rudder 3/4" left/right (15% expo)

(Expert tip: Once the control throws have been set, cut a few pieces of medium silicone fuel tubing (or heat shrink tubing) to go around each of the clevises. This will keep them from opening during flight.)

Also we strongly suggest mixing your rudder and ailerons together, assuming you have that capability in your radio. It will make for much smoother turns.

Preflight:

Charge both the transmitter and receiver pack for your airplane. Use the recommended charger supplied with your particular radio system, following the instructions provided with the radio. In most cases, the radio should be charged the night before going out flying.

Check the radio installation and make sure all the control surfaces are moving correctly (i.e. the correct direction and with the recommended throws). Test run the engine and make sure it transitions smoothly from idle to full throttle and back. Also ensure the engine is tuned according to the manufacturer's instructions, and it will run consistently and constantly at full throttle when adjusted.

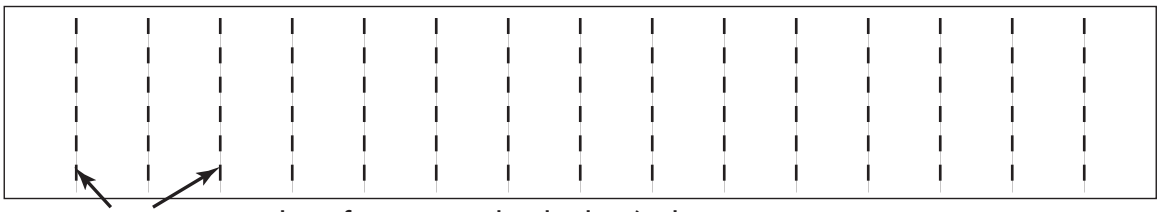
Check all the control horns, servo horns and clevises to make sure they are secure and in good condition. Replace any items that would be considered questionable. Failure of any of these components in flight would mean the loss of your aircraft.

Range check your radio before flying

Before each flying session, range check your radio. This is accomplished by turning on your transmitter with the antenna collapsed. Turn on the radio in your airplane, but do not attach the arming switch.

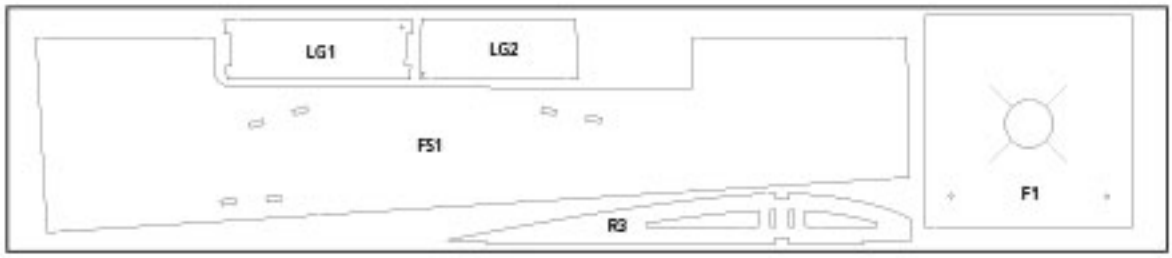
With your airplane on the ground, you should be able to walk 30 paces away from your airplane and still have complete control of all functions.

If not, don't attempt to fly! Have your radio equipment checked out by the manufacturer.

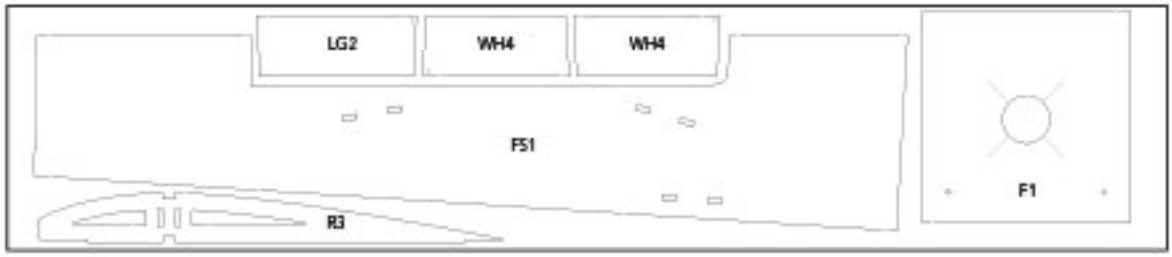


Cut at .375" intervals to form 16 individual C/A hinges.

LP1
1/8" Lite Ply

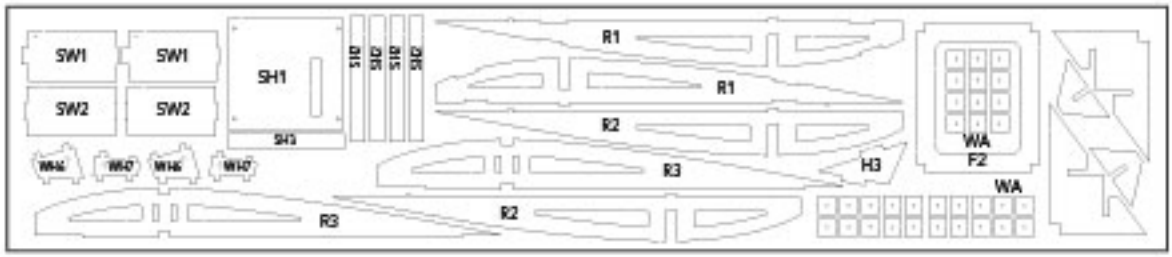


LP2
1/8" Lite Ply



LP3
1/8" Lite Ply

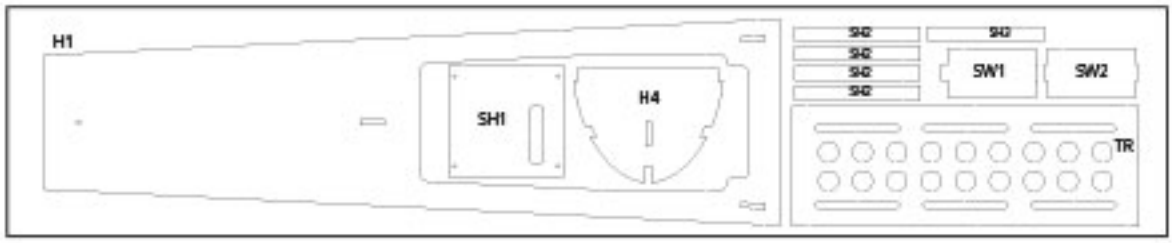
LP4
1/8" Lite Ply



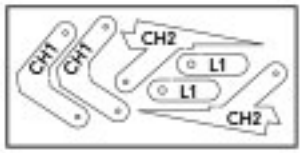
LP5
1/8" Lite Ply

LP6
1/8" Lite Ply

LP7
1/16" Ply

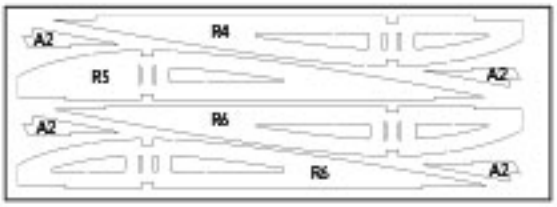


LP8
1/16" Ply

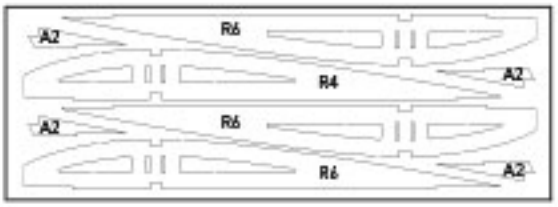


DH1
1/8" Ply

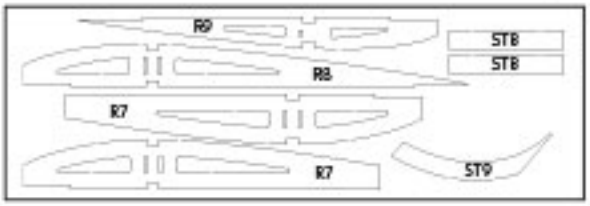
BP1 3/32" Balsa



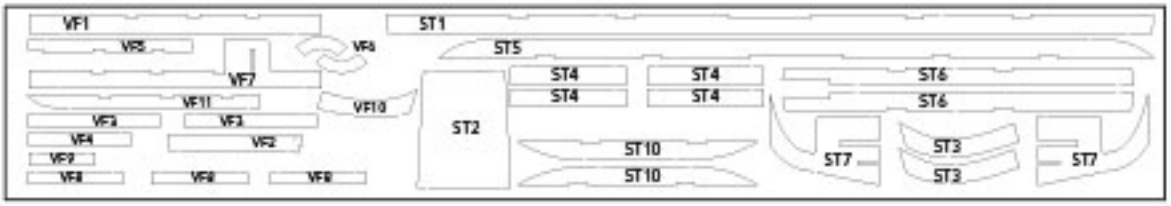
BP2 3/32" Balsa



BP3 3/32" Balsa

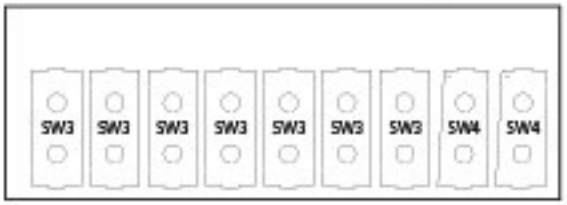


BP4 3/32" Balsa

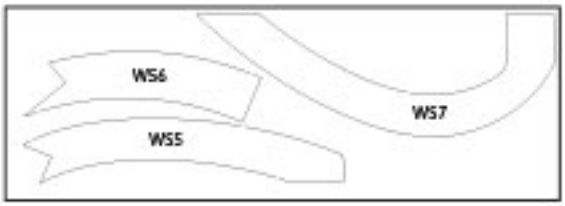


BP5 1/16" Balsa

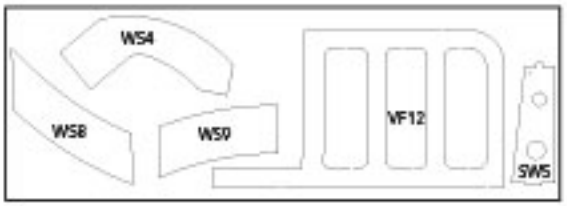
BP6 1/16" Balsa



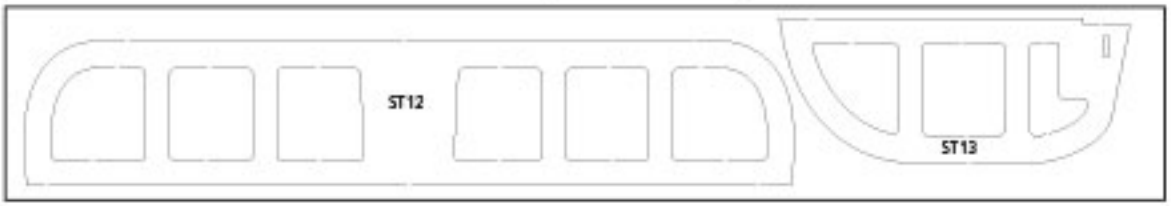
BP7 1/16" Balsa



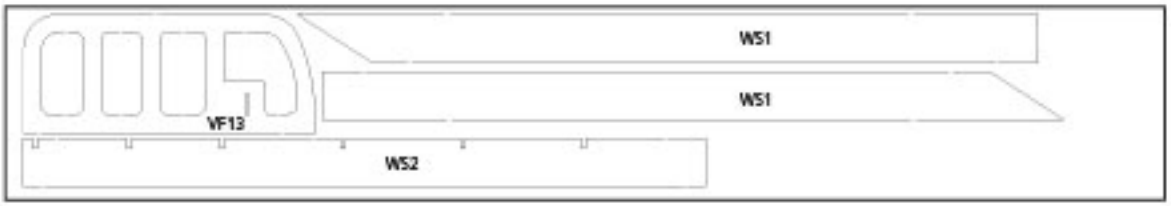
BP8 1/16" Balsa



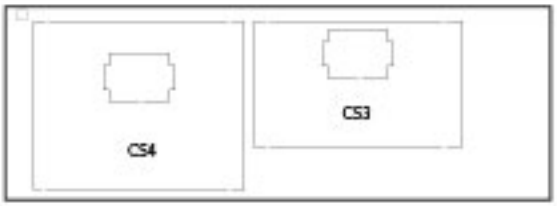
BP9 1/16" Balsa



BP10 1/16" Balsa

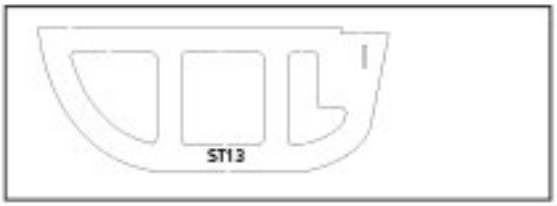


BP11 1/16" Balsa



BP12 1/16" Balsa

BP13 1/16" Balsa



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If you find any damaged or missing parts, contact us within 60 days from purchase to receive replacement(s).

Further, **Old School Model Works** reserves the right to change or modify this warranty without notice.

In that **Old School Model Works** has no control over the final assembly or material used for the final assembly, no liability shall be assumed nor accepted for any damage of the final user-assembled product. By the act of using the product, the user accepts all resulting liability.

Limit of Liability

In the use of this product, our only obligation shall be to replace such quantity of the product proven to be defective. The user shall determine the suitability of the product for his or her intended use and shall assume all risk and liability in connection therewith.

If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unopened condition.

As of this printing, you are required to register with the FAA if you own this product. For up-to-date information on how to register with the FAA, visit https://registermyuas.faa.gov .

For additional assistance on regulations and guidance of UAS usage, visit http://www.knowbeforeyoufly.org .

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